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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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08/931,125 09/16/97 LEE

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EXAMINER

PORTKA, G

ART UNIT

PAPER NUMBER

2751

DATE MAILED:

04/20/99

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

08/931,125

Applicant(s)

LEE

Examiner

GARY PORTKA

Group Art Unit

2751

---The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address---

Period for Response

A SHORTENED STATUTORY PERIOD FOR RESPONSE IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a response be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for response is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to respond within the set or extended period for response will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- ☒ Responsive to communication(s) filed on 9/16/97, 1/22/98, 10/20/98.
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-6 is/are pending in the application.
- Of the above claim(s) _____ is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 1-6 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement.

Application Papers

- ☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☒ The drawing(s) filed on 9/16/97 is/are objected to by the Examiner.
- ☒ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☒ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been received.
- ☐ received in Application No. (Series Code/Serial Number) _____.
- ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 4, 6
- ☒ Notice of References Cited, PTO-892
- ☒ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

Office Action Summary

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DETAILED ACTION

1. The Office acknowledges receipt of the following items:
 - a. Signed Declaration, received January 22, 1998.
2. Claims 1-6 are presented for examination.

Priority

3. The Office acknowledges Applicant's claim for priority based upon Application No.1996-40202 filed in Korea on September 16, 1996. The inclusion of this information under "Claim For Priority" on the first page of the specification is questioned, however; note also that a copy of the application will not be "annexed hereto" (page 1 line 10) when this application is issued.

Information Disclosure Statement

4. The information disclosures submitted September 16, 1997 (paper no. 4) and October 20, 1998 (paper no. 6) were considered.

Drawings

5. The drawings are objected to because:
 - a. It appears that Figures 1 and 3 should be labeled "Prior Art" since only that which is old is shown.
 - b. In Figure 3 at item 10 change "Targer" to "Target".

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- c. In Figure 5 at item 42 before "Controller" insert "To".

Correction is required.

- 6. Applicant is reminded of the provision of MPEP 608.02(q) and (r) regarding a separate letter to the Chief Draftsman and 608.02(v) regarding the requirement for filing red line sketches of any proposed drawing changes.

Specification

- 7. The disclosure is objected to because of the following informalities:
 - a. At page 10 line 14 "CPU 3" should be changed to --CPU 30--.Appropriate correction is required.
- 8. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

- 9. The disclosure is objected to because of the following informalities:
 - a. In claim 1 at line 8, the claim meaning would be better clarified by changing "a corresponding cache" to --each corresponding cache--. At line 10, "information needed for recovery of data read" is not understood; if data has been read then it has been recovered. At line 11, "information needed for recovery of data calculated" appears to say that the data is calculated.

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b. In claim 2 line 2, “data recovery information with relation to data” is not understood; for example, all data recovery information would have relation to data. Also at line 2, “each” implies all, which is not thought to be correct; this will be interpreted as “one” or “any”.

c. In claim 3 line 2, for better clarity and consistency, it is suggested to change “are” to --being--.

d. In claim 4 line 2, it is suggested “calculation process” be changed to --a calculation process-- or --calculation processing--.

e. In claim 5 lines 2-3, “of previous data, recovery information with relation to the previous data and new data” is not entirely understood; perhaps a comma inserted after “previous data” clarifies the intended meaning.

f. In claim 6 line 13, “alternatively” is not clear; it is suggested at line 12 to delete the semicolon and insert --, or-- therefor, then continuing “alternatively ...” on the same line (without a return). At line 17, “the old parity information read” lacks antecedent basis when considering the first option of “alternatively” at lines 11-12. At line 18, “updating the cache table” does not further limit the claim when considering the second option of “alternatively” at lines 14-15, and is therefore unclear. It further is noted that a “cache table” is not specifically shown in the drawings or otherwise explained in the specification, and is therefore assumed to be part of the cache (for example, a tag for each entry). At line 19, it is thought to be inaccurate to state that new data and new parity are written at the target location; how can they be written at the same location?

Appropriate correction is required.

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Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

11. Claims 1-2 are rejected under 35 U.S.C. 102(e) as being anticipated by Jones, U.S. Patent 5,572,660.

12. As to claim 1, Jones discloses a memory system comprising:

a. Plurality of defect-adaptive devices (214) as claimed, the second region seen as disk drives 214-1 through 214-7, and the first region as disk drive 214-8 (see Abstract and front page figure);

b. Plurality of caches (212 and 213) respectively connected to the devices as claimed (see Abstract and front page figure);

c. Controller (210) connected to each device and cache, controlling writing and reading, calculating information needed for data recovery, and storing that information in a predetermined cache (see Abstract; also see column 2 line 62 to column 4 line 6).

13. As to claim 2, Jones discloses that the controller determines if the information needed for data recovery is in the cache (see Figure 3D item 344, and Figure 3E item 370).

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Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones, U.S. Patent 5,572,660.

16. As to claim 3, Jones does not disclose that the information needed for data recovery is sequentially set up from the most outer cylinder. However, Examiner takes Official Notice that such an arrangement would have been well known and desirable to one of ordinary skill in the art. The artisan designating how to store parity on the disk would have desired to store it in a simple, logical fashion so as to simplify locating it later; a sequential arrangement starting at one end is the simplest, most logical arrangement. An artisan further would have known that the sequence might then be started at the most inner or the most outer cylinder. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to sequentially set up the recovery information from the most outer cylinder in Jones, because this provides a simple; logical means of tracking and locating the information later.

17. As to claim 4, Jones discloses that information needed for data recovery is modified to a value obtained through a calculation process of new data recovery information (see column 9 lines 8-21).

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18. As to claim 5, Jones discloses XORing of previous data, previous recovery information, and new data (see column 9 line 16 equation).

19. As to claim 6, Jones discloses a RAID system comprising:

a. Plurality of disk drives (214) storing data blocks and parity information (see Abstract and front page figure);

b. Plurality of caches (212 and 213) storing parity information (see Abstract and front page figure);

c. Controller (210) connected to each disk drive and cache controlling write of data and parity by:

i. Calculating target location on disk upon receiving write instruction (see Figure 3A items 308 and 330);

ii. Reading old data from the disk (see Figure 3C item 360);

iii. Determining if old parity is in the cache, and reading old parity from the cache, or from the disk, and updating the cache (see Figure 3E items 370, 376-378, and Figure 3F item 392);

iv. Calculating new parity after performing XOR between old parity and new data (see Figure 3F item 390, and column 9 line 16 equation);

v. Writing the new data and new parity on the target location (see Figure 3F item 394, and column 3 lines 25-40).

Jones does not specifically disclose that each disk drive stores data and parity in the preferred embodiment. However, Jones states at column 3 lines 15-18 that a similar write-back caching scheme

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may be used for a RAID-5 system. At column 2 lines 46-53, it is taught that distributing the parity across the disk drives as in RAID-5 improves write throughput, thus motivating an artisan to attempt to implement the method of Jones in RAID-5. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to store data and parity on each disk drive, because this is done with RAID-5, which improves write throughput as taught by Jones.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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5,835,940	Multiple RAID modes with caching of parity via two caches.
5,734,814	RAID system with combined system memory/disk array cache for data and parity.
5,583,876	RAID method of writing new error correction code at sequential locations.

21. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) days from the mail date of this letter. Failure to respond within the period for response will result in Abandonment of the application (see 35 USC 133, MPEP 710.02, 710.02(b)).

22. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 308-9051, (for formal communications intended for entry)

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or:

(703) 308-5359 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

23. Any inquiry concerning this communication from the Examiner should be directed to Gary J. Portka at telephone number (703) 305-4033. The Examiner can normally be reached on weekdays from 9:00 A.M. to 5:30 P.M.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Eddie Chan, can be reached on (703) 305-9712. The fax phone number for this Group is (703) 308-5359.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703) 305-3900.

GJP

Gary J. Portka
Patent Examiner
April 16, 1999


EDDIE P. CHAN
SUPERVISORY PATENT EXAMINER